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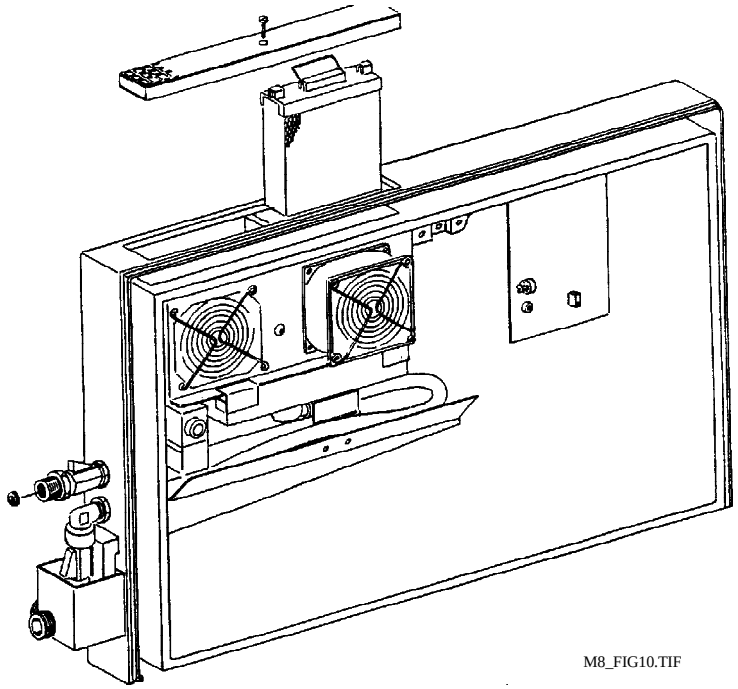
HUMIDIFIER SERVICE MANUAL

for all

Kodak MINILOADER'S



M8_FIG10.TIF

Use this Publication for:-
All Miniloaders fitted with the Humidifier Kit, and Low Voltage Miniloaders Service Codes 3419, 3420 & 3421

HEALTH SCIENCES DIVISION

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CAUTION

This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

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THEORY GUIDE.

The HUMIDIFIER contains the following parts. See the DIAGRAMS on the opposite page.

1) A water supply MANUAL VALVE - this VALVE incorporates a RESTRICTOR which can be removed if using a low pressure supply - such as a BOTTLE.

2) A water inlet SOLENOID VALVE which is energised when the HUMIDIFIER requires water.

3) A water level FLOAT SWITCH which controls the water level in the WATER BATH.

4) A WATER BATH to hold water for the PAPER ELEMENT.

5) A PAPER ELEMENT which draws water up in front of the WET FAN.

6) A WET FAN which is switched on when the humidity level inside the MINILOADER is lower than the SET POINT.

7) A DRY FAN which runs when the WET FAN is switched off to maintain a positive pressure in the MINILOADER.

8) An OVERFLOW DRAIN which operates if the water level control fails.

9) A SAFETY OVERFLOW CHUTE which prevents water entering the MINILOADER.

10) A MANUAL DRAIN VALVE which allows the drainage of the HUMIDIFIER for service or machine transport.

11) A DRAIN HEADER which collects all water from the OVERFLOWS and the DRAIN VALVE. This DRAIN HEADER ***MUST*** be connected to a customer drain or a bottle if the water supply is from a bottle.

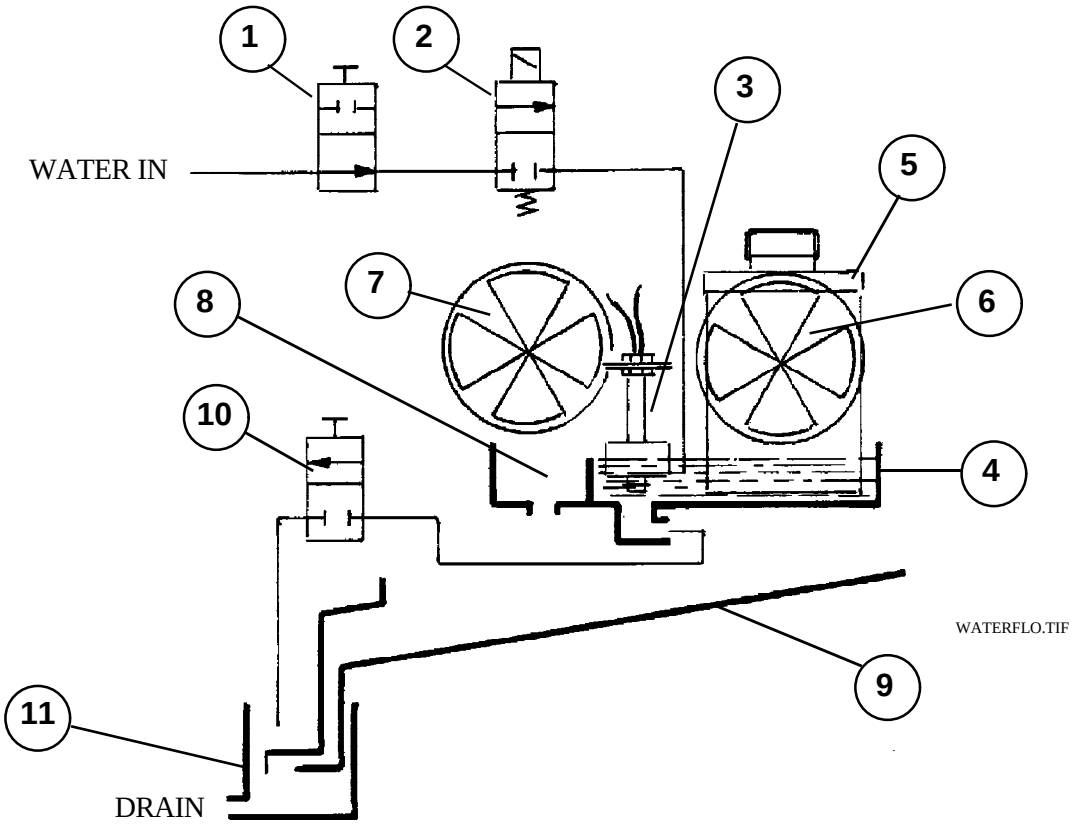
12) A HUMIDITY SENSOR which measures the humidity inside the MINILOADER.

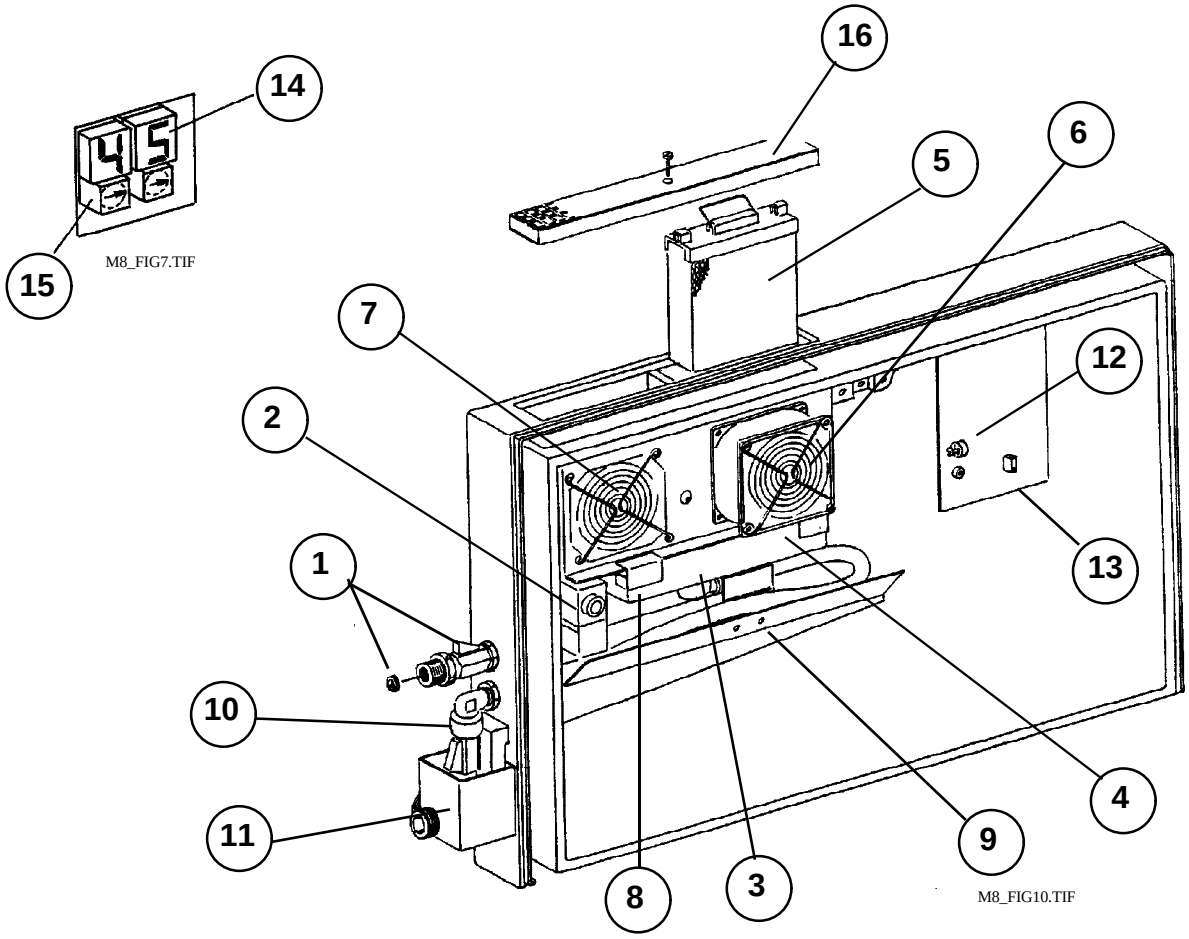
13) A MICROPROCESSOR CONTROL PCB which monitors and controls the functions of the HUMIDIFIER.

14) A two digit DISPLAY which shows the current HUMIDITY inside the MINILOADER.

15) CONTROL SWITCHES which are used to set the desired humidity level.

16) An AIR FILTER to prevent dust entering the HUMIDIFIER.


1
2
3
WATER IN
5
7
6
8
10
4
WATERFLO.TIF
9
11
DRAIN


16
14
6
5
M8_FIG7.TIF
15
7
12
2
1
13
10
4
11
9
8
3
M8_FIG10.TIF

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INSTALLATION INSTRUCTIONS.

WATER SUPPLY

The incoming water supply specification is:-

PRESSURE RANGE	0.3 to 5 Bar. Install a REGULATOR if required.
TEMPERATURE	4 to 29 °C Tempered water required if temperature of incoming water is below 4 °C.
VOLUME APPROX.	1Lite per 24 hours approximately (depending on room humidity).

A 50 micron WATER FILTER should be provided by the customer.

Connect the water supply to the WATER INLET. If a BOTTLE is being used to supply the inlet water, the RESTRICTOR should be removed. If the water supply is at mains pressure, the RESTRICTOR ***MUST*** be fitted, otherwise water can splash inside the MINILOADER when the SOLENOID VALVE opens.

The drain must be connected. Normally water only flows from the unit when the HUMIDIFIER is drained for service purposes or if the MINILOADER is to be moved, but in the event of a failure of the SOLENOID VALVE the drain is required to have a capacity of 1 Litre/minute.If the water supply is at mains, the drain should be connected to a fixed customer drain.

If the water supply is from a BOTTLE, a larger size collecting BOTTLE than the inlet BOTTLE should be used.

IMPORTANT:- If the MINILOADER is in a mobile unit, or is mounted on a movable STAND, the customer must be informed that the water must be turned off and the HUMIDIFIER drained using the DRAIN VALVE, before the MINILOADER is moved. If the MINILOADER is not going to be used for some time, it is advisable to drain the HUMIDIFIER of water to prevent bacterial growth in the PAPER ELEMENT.

When the MINILOADER is switched on, the HUMIDIFIER is also turned on. The DISPLAY will show the current humidity inside the MINILOADER. If the humidity inside the MINILOADER is greater than the preset value, only the DRY FAN will run. If the humidity is below the preset value, the SOLENOID VALVE opens, the DRY FAN stops and the WET FAN starts to increase the humidity.

If the humidity inside the MINILOADER is different (either higher or lower) from the preset value after 10 minutes, the figures on the DISPLAY will flash. If the humidity inside is higher than the preset value nothing can be done, but if the humidity is lower, check the water supply, FLOAT VALVE and the PAPER ELEMENT.

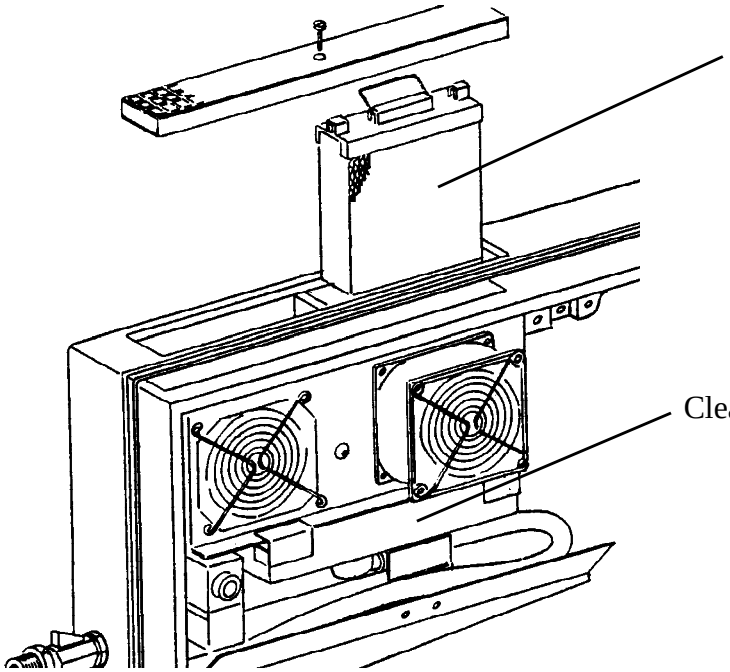
The speed of the WET and DRY FANS (and therefore the noise made by them) can be controlled.

For LOW VOLTAGE machines the speed is contolled by POTENTIOMETERS on PCB 207. The recomended setting is R730 (for the DRY FAN) turn fully clockwise then back 5 turns anf R728 (for the WET FAN) turn fully clockwise then back 3 turns.

For KIT HUMIDIFIERS the speed of both FANS are adjusted at the same time by a POTENTIOMETER mounted on the FAN ASSEMBLY. See the drawing on PAGE XP/2-26.

SERVICE

Routine service of the HUMIDIFIER requires that the unit is thoroughly cleaned out when a PM (Preventative Maintenance) CALL is carried out. Disinfectant or bleach should be used. The PAPER ELEMENT should be changed if necessary, and must be changed if it is more than six months old. The LABEL inside the HUMIDIFIER should be checked with the date of the ELEMENT change.



M8_FIG10.TIF

ACHTUNG

ZUR MINDERUNG DES BAKTERIOLOGISCHEN WACHSTUMS

muβ bei jeder WARTUNG, spätestens alle 6 Monate, der Luftbefeuchter-Wasserbehälter entleert, gereinigt, desinfiziert und die Filterkassette gewechselt werden.

CAUTION

BIOLOGICAL GROWTH MAY BE PRESENT

Change the humidifier filter every 6 month in addition to draining the reservoir and cleaning it with desinfectant at every PREVENTIVE MAINTENANCE

ATTENTION

DEVELOPPEMENT BACTERIOLOGIQUE POSSIBLE

Changer le filtre de l'humidificateur tous les 6 mois; vidanger et nettoyer le réservoir avec un désinfectant à chaque MAINTENANCE PREVENTIVE

LAST FILTER CHANGE

1994	1995	1996	1997
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12

1998	1999	2000	2001
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12

LABEL.TIF

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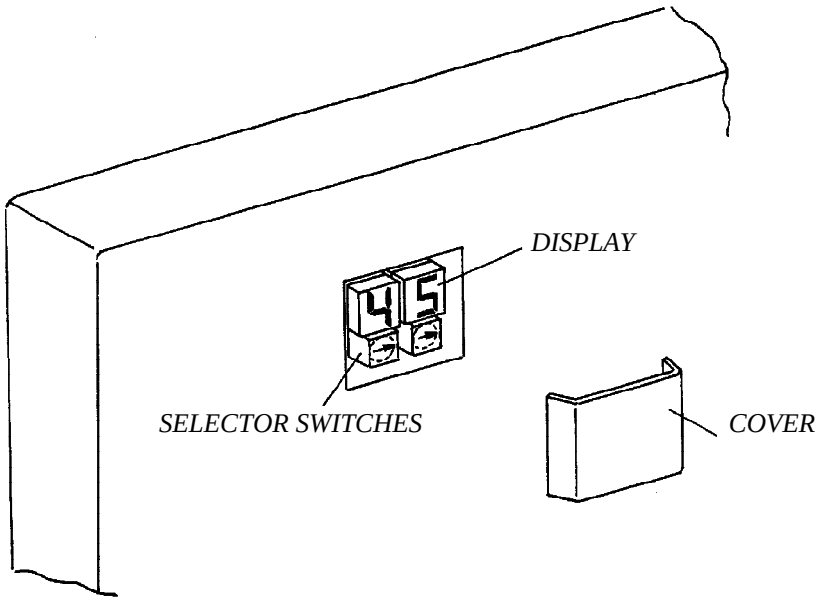
IMPORTANT. If the HUMIDIFIER supplied with a new LOW VOLTAGE MINILOADER, the PCB will be PCB 208. If the HUMIDIFIER was fitted as a modification, the PCB will be PCB 209. The two PCB's are NOT interchangable.

To alter the humidity setting, remove the clear plastic COVER and set the SELECTOR SWITCHES to the desired humidity. The recommended preset is 45% RH. Replace the COVER.



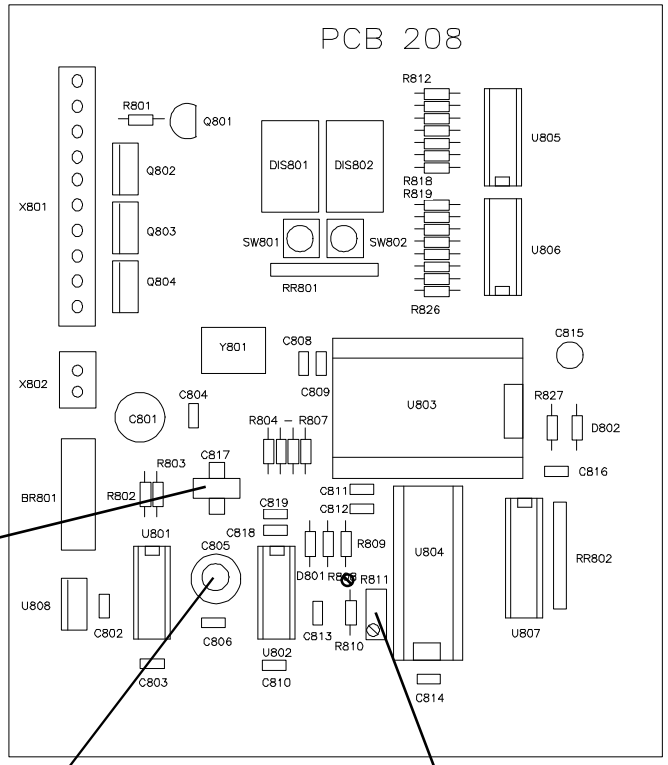
When the MINILOADER is powered up, the HUMIDIFIER will switch on automatically. If the humidity inside the MINILOADER is greater than the preset value, only the DRY FAN will run. If the humidity is below the preset value, the INLET WATER VALVE opens, the DRY FAN stops and the WET FAN starts to increase the humidity inside the MINILOADER.

IMPORTANT :- If the humidity inside the MINILOADER is different (either higher or lower) from the preset value after 10 minutes, the figures on the DISPLAY will flash. If the humidity is higher than the preset nothing can be done, but if the humidity is lower, check the water supply, FLOAT VALVE and the FILTER ELEMENT.

The calibration of the HUMIDITY SENSOR is factory set, but if a HUMIDITY METER (29050132) is available the calibration of the DISPLAY can be adjusted. After the unit has stabilised (after 30 minutes), measure the humidity inside the MINILOADER by inserting the PROBE of the HUMIDITY METER through the ENTRY SLOT. Compare the reading on the HUMIDITY METER with the HUMIDIFIER DISPLAY. If necessary the HUMIDIFIER DISPLAY reading can be adjusted by POTENTIOMETER R11 on the HUMIDIFIER PCB 209. See FIGURE 9.

IMPORTANT - DO NOT TOUCH THE VARIABLE CAPACITOR OR YOU WILL ALTER THE FACTORY SETTING.

PCB 208
LOW VOLTAGE
MACHINES ONLY



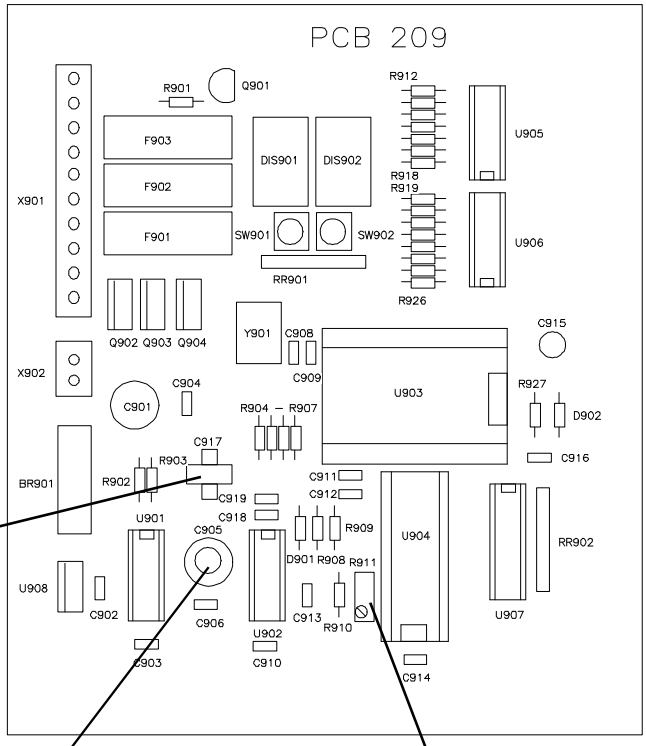
PCB208.PIC

HUMIDITY SENSOR

CALIBRATION - DO NOT TOUCH - FACTORY SET

DISPLAY ADJUSTMENT

PCB 209
KIT HUMIDIFIERS
ONLY



PCB209.PIC

HUMIDITY SENSOR

CALIBRATION - DO NOT TOUCH - FACTORY SET

DISPLAY ADJUSTMENT

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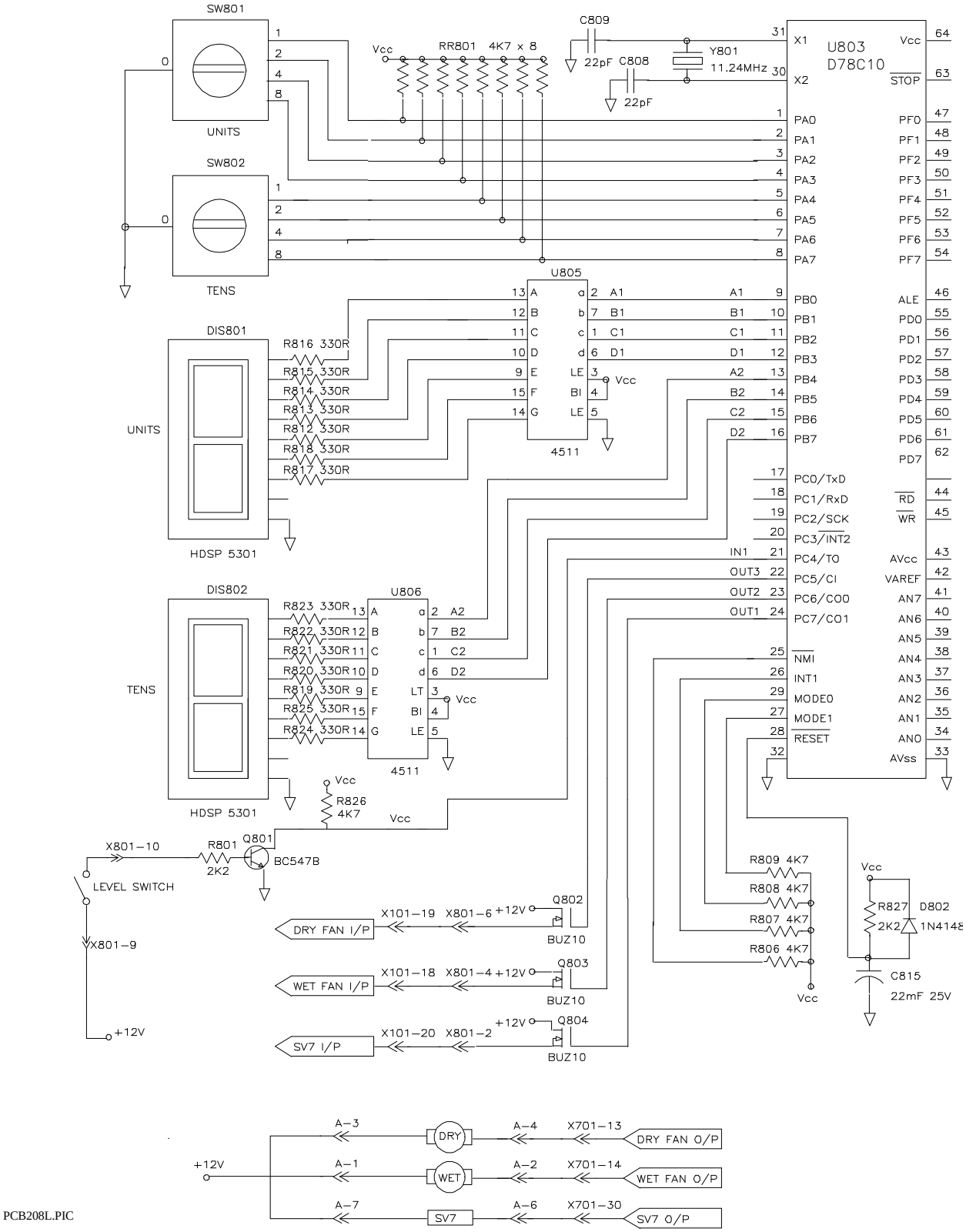
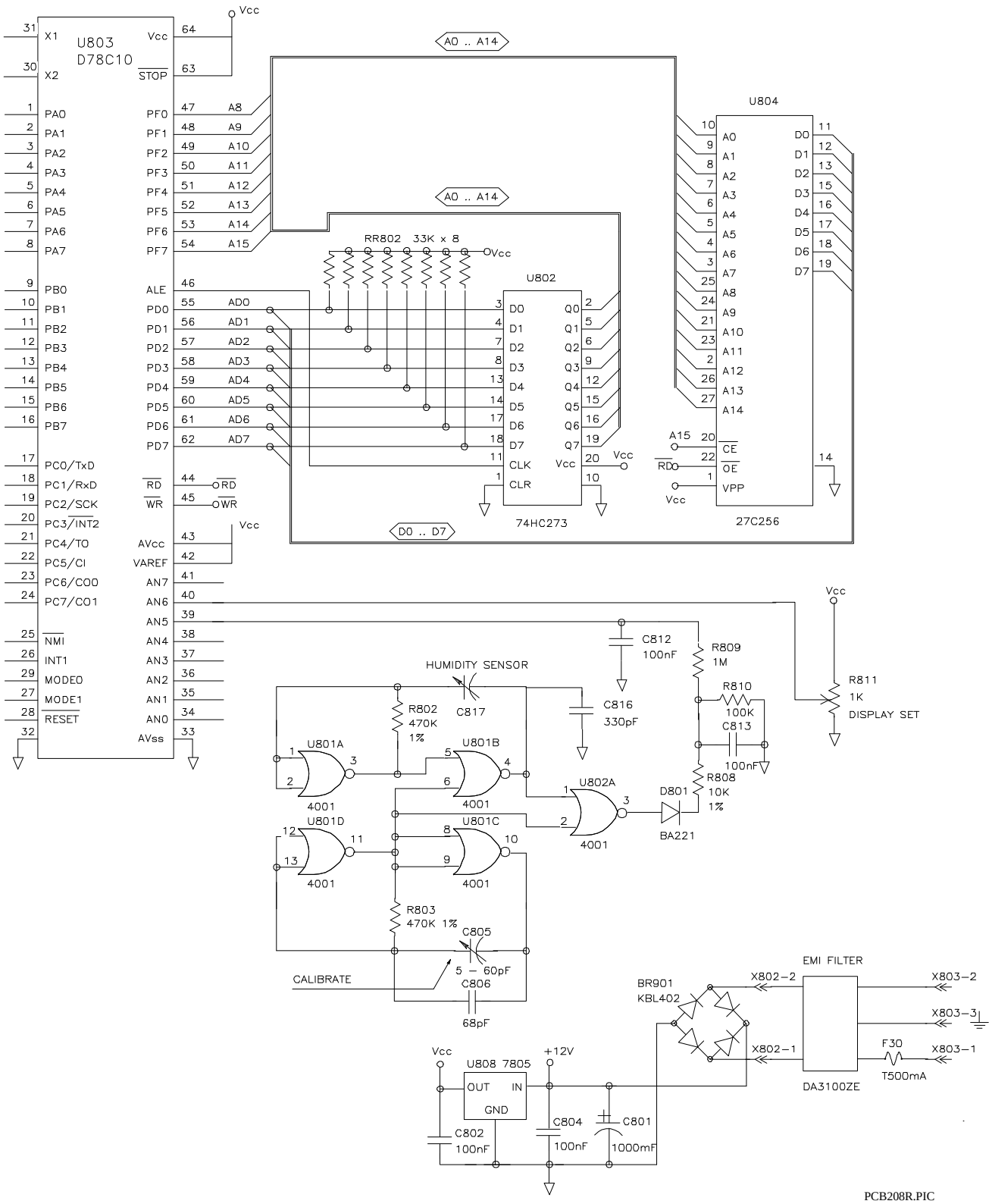
PCB 208 (LOW VOLTAGE MACHINE HUMIDIFIERS ONLY)



PCB 208 (LOW VOLTAGE MACHINE HUMIDIFIERS ONLY)



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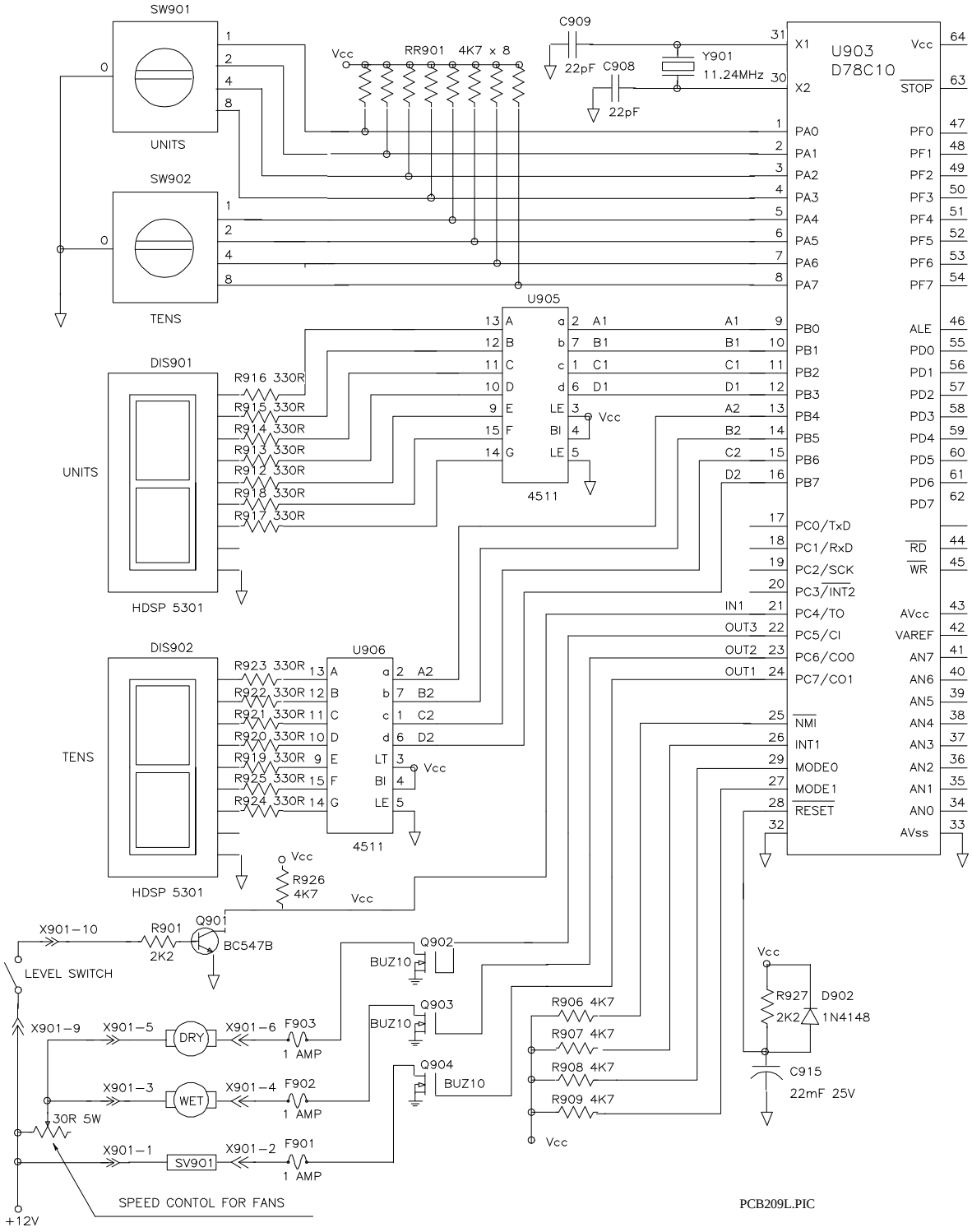
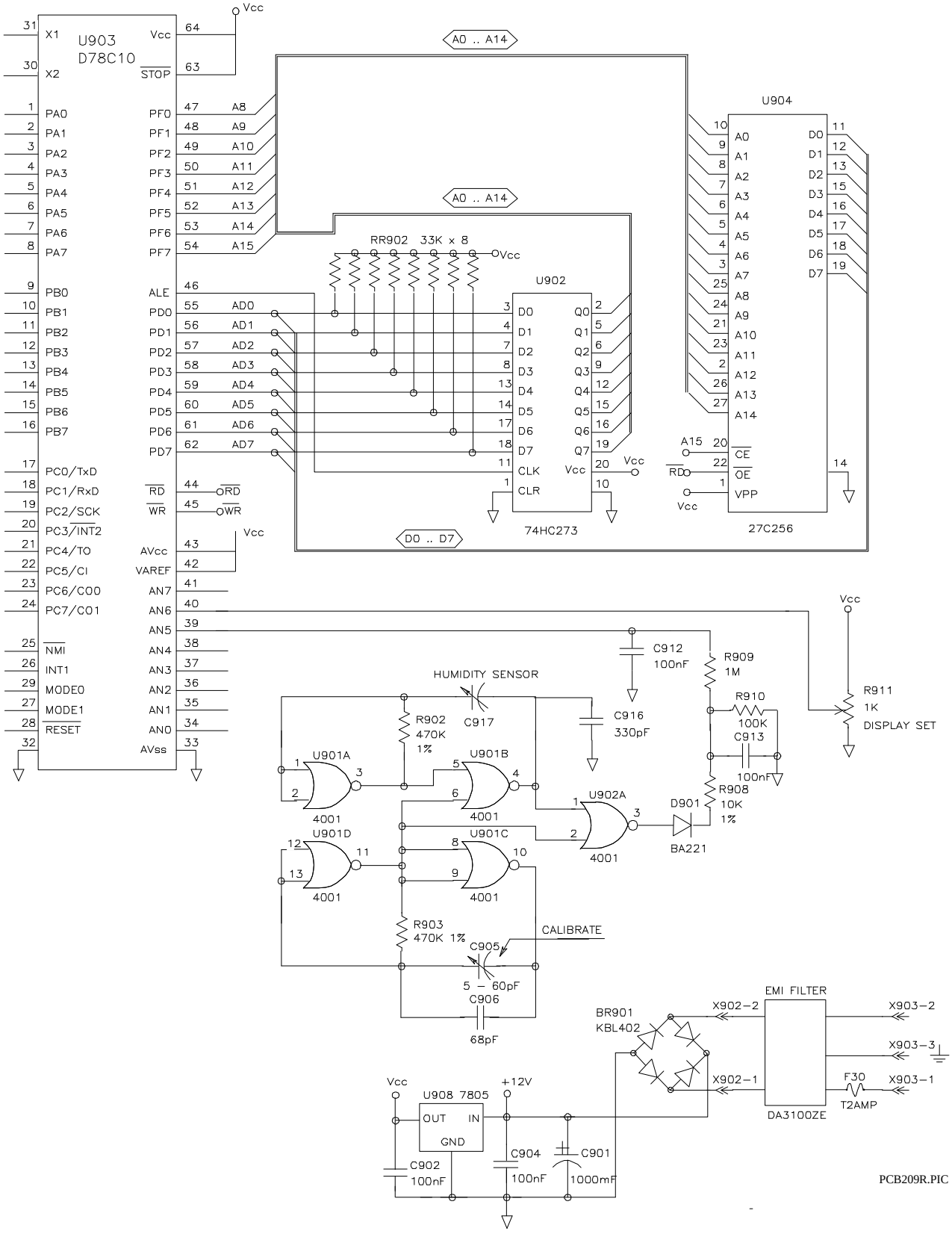
PCB 209 (KIT HUMIDIFIERS ONLY)



PCB 209 (KIT HUMIDIFIERS ONLY)



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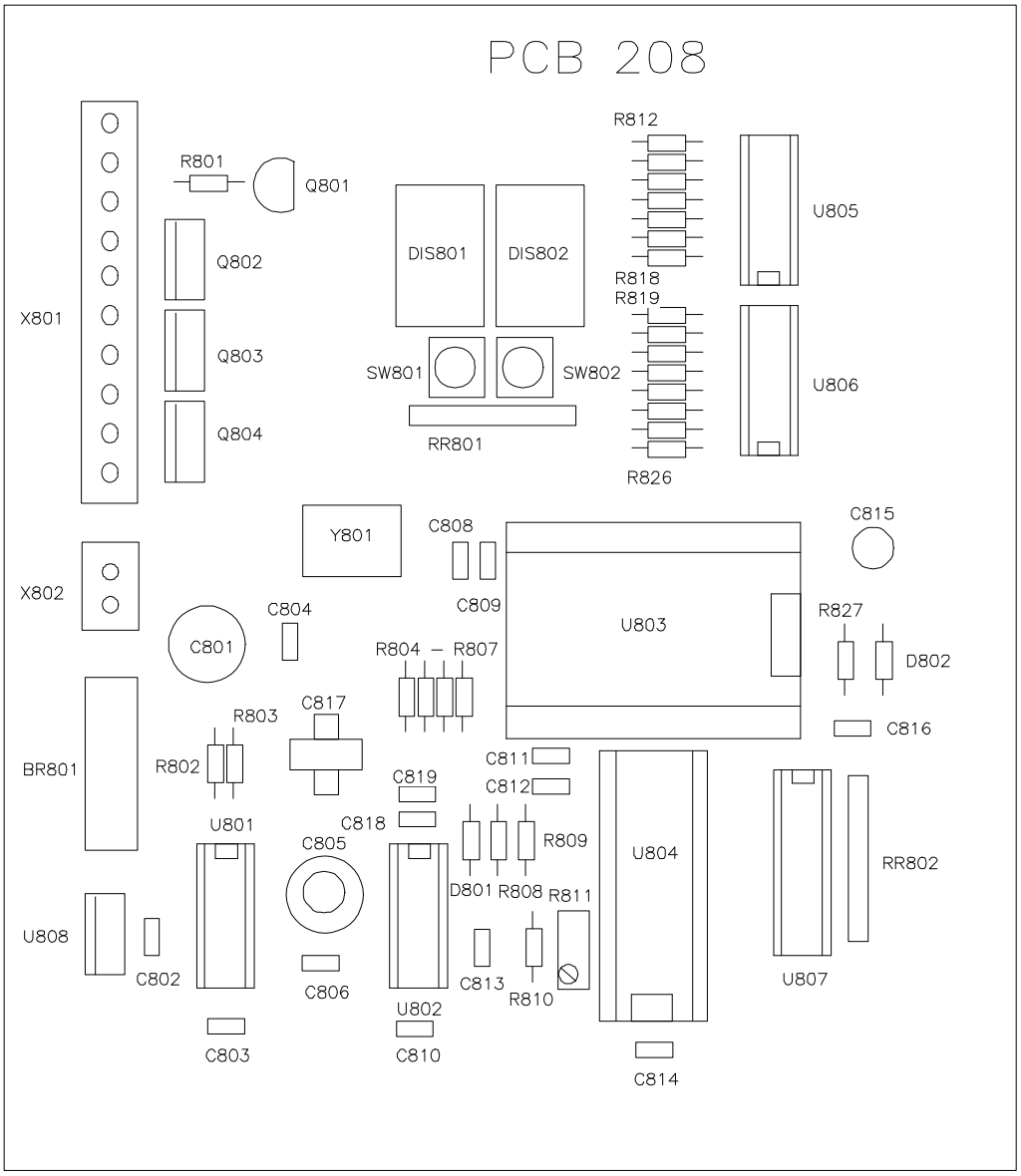
PCB 208 (LOW VOLTAGE MACHINE HUMIDIFIERS ONLY)

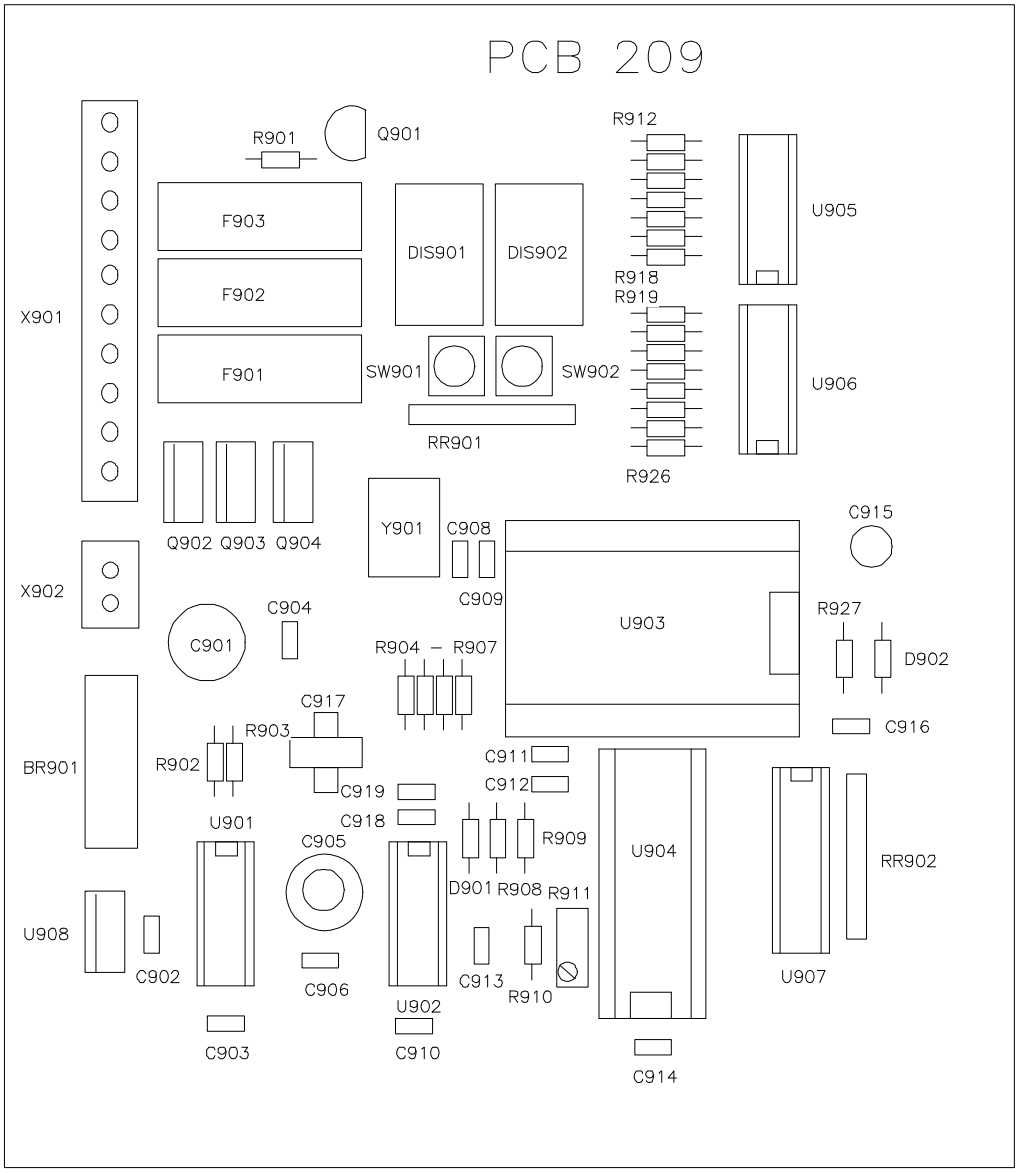
COMPONENT OVERLAY



PCB208.PIC

PCB 209 (KIT HUMIDIFIERS ONLY)

COMPONENT OVERLAY



PCB209.PIC

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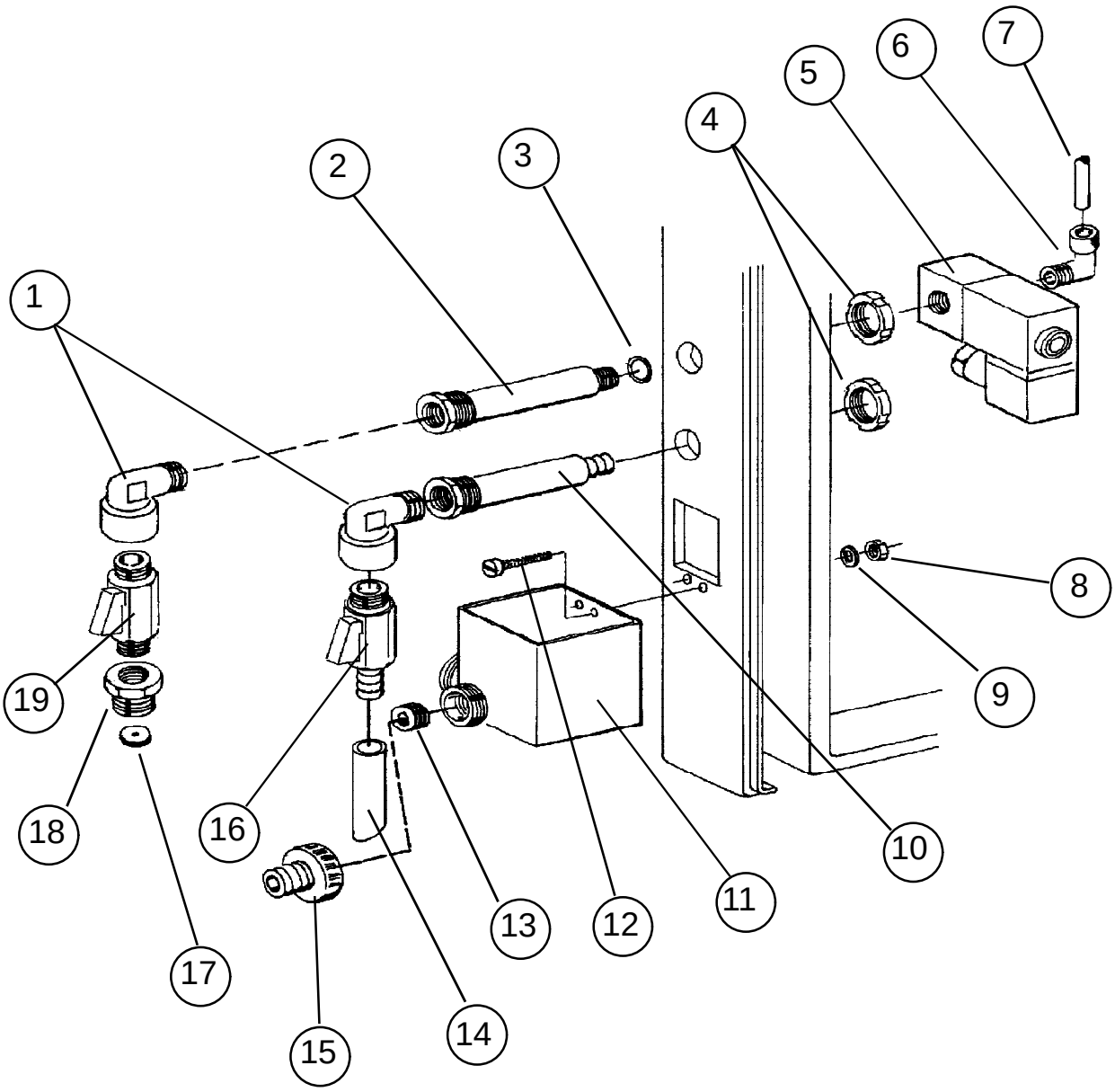

HUMIDIFIER ASSEMBLY
FIG A

PARTS1.TIF

KEY	PART NO	DESCRIPTION
1	30027208	ELBOW
2	30027129	FITTING, INLET
3	30027213	SEAL, "O" RING
4	30027217	NUT, M20
5	30027200	SOLENOID VALVE, WATER INLET, 12 VOLT
6	30015592	ELBOW, 1/8"
7	30015590	TUBE, RIGID, 5 x 3 mm
8	30015563	NUT, M3
9	30025818	WASHER, M4 x 12
10	30027130	FITTING, OUTLET
11	30027122	DRAIN HEADER
12	30027221	SCREW, CROSS HEAD, M3 x 25
13	30027215	PLUG, 3/8"
14	30027209	PIPE, 10 x 14 mm
15	30027216	ADAPTOR, 3/4" x 15 mm
16	30027206	VALVE, DRAIN
17	30027126	RESTRICTOR
18	30027204	REDUCER, 3/4" M x 3/8" F
19	30027205	VALVE, WATER INLET

HUMIDIFIER ASSEMBLY
FIG A

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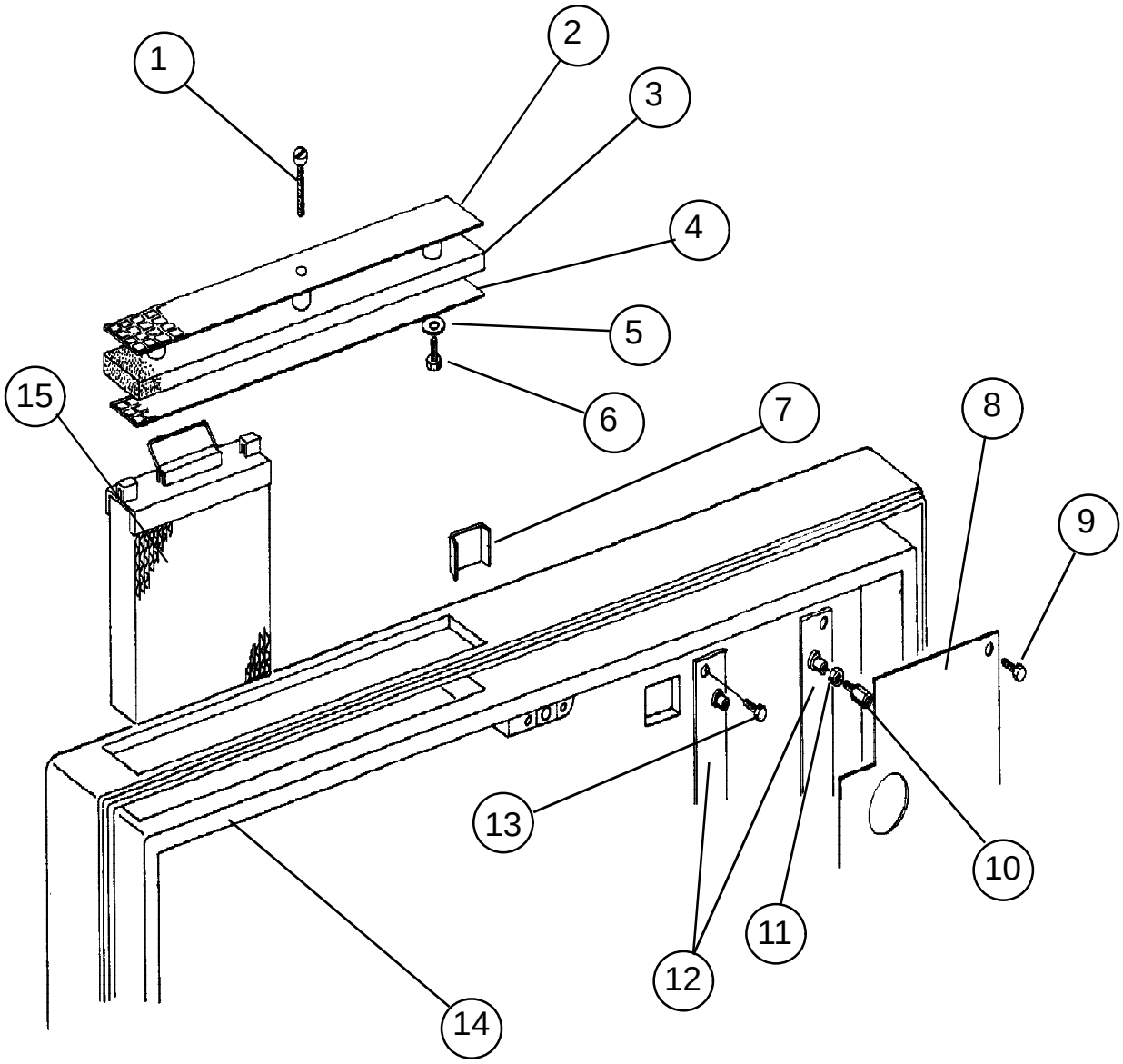


HUMIDIFIER ASSEMBLY
FIG B

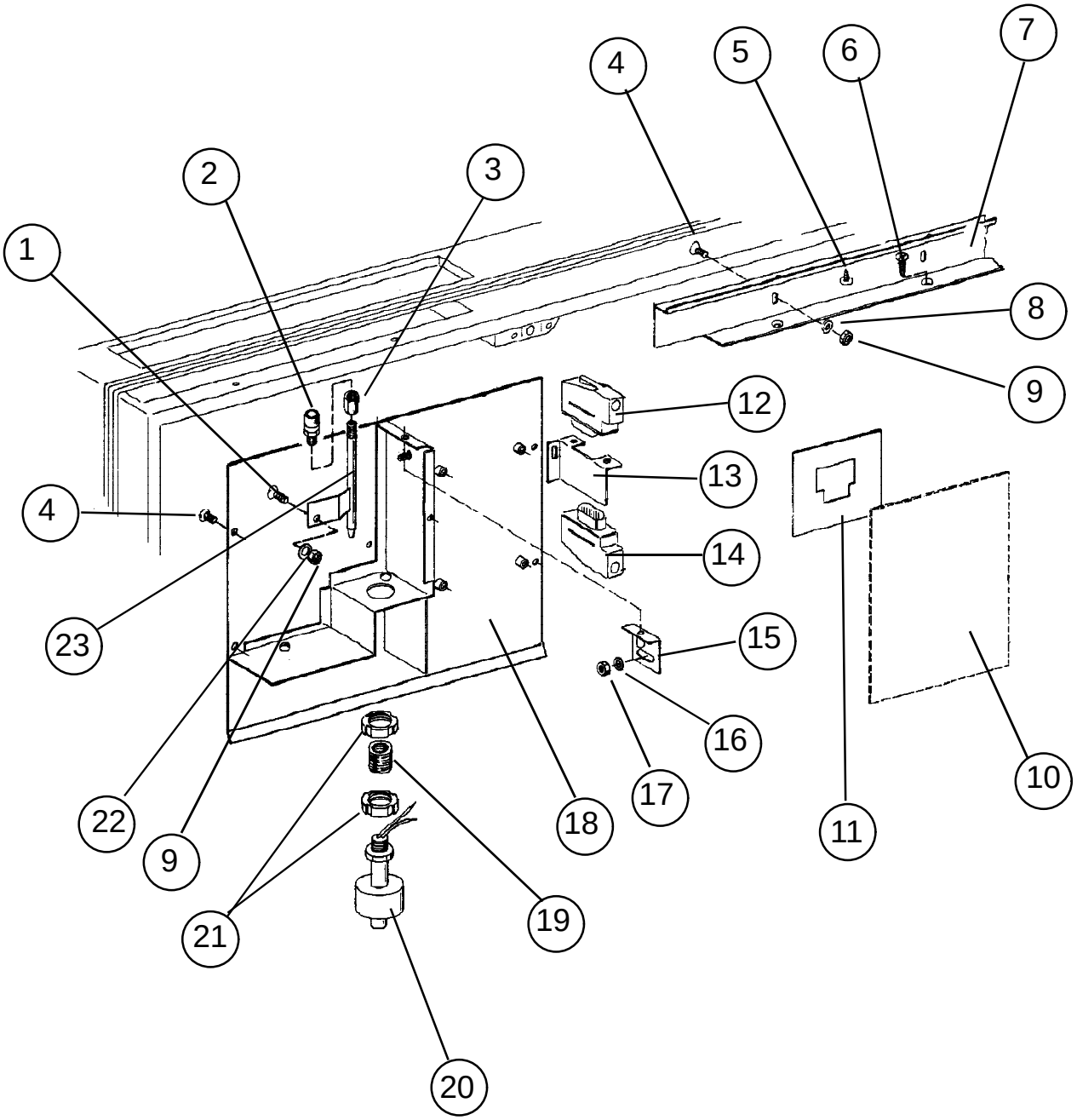
PARTS2.TIF

KEY	PART NO	DESCRIPTION
1	30027221	SCREW, CROSS-HEADED, M3 x 25
2	30027112	COVER, FILTER
3	30027113	FILTER, AIR
4	30027111	SUPPORT, FILTER
5	30025818	WASHER, M4 INTERNAL, M12 EXTERNAL
6	30015611	SCREW, HEX-HEADED, M3 x 6
7	30027128	COVER, DISPLAY
8	30027141	GUARD, PCB 208/209
9	30025813	SCREW, HEX-HEADED, M4 x 6
10	30015685	STUD, M4 x 10
11	30015564	NUT, M4
12	30027140	SUPPORT, PCB, MINI 2 & 2 PLUS ONLY
	30027139	SUPPORT, PCB, MINI 1 & 1M ONLY
13	30015682	SCREW, HEX-HEADED, M3 x 8
14	30027103	HOUSING - MODEL M35-M ONLY
	30027104	HOUSING - MINI 2 & 2 PLUS MODEL SA & 480RA
	30027105	HOUSING - MINILOADER 1 & 1M ONLY
15	30027202	FILTER CARTRIDGE

IMPORTANT - MAKE SURE YOU ORDER THE CORRECT PARTS FOR THE VERSION OF HUMIDIFIER THAT IS FITTED TO THE MINILOADER

HUMIDIFIER ASSEMBLY
FIG B

 © Kodak Ltd.



HUMIDIFIER ASSEMBLY
FIG C

KEY	PART NO	DESCRIPTION
1	30015557	SCREW, CROSS-HEAD, COUNTERSUNK, M3 x 10
2	30027210	CONNECTOR, HOSE
3	30027211	ADAPTOR
4	30015556	SCREW, CROSS-HEAD COUNTERSUNK, M3 x 6
5	30027222	SCREW, SELF-TAPPING, 3.5 x 6.5 mm
6	30025851	SCREW, CROSS-HEAD, SELF-TAPPING, 3.9 x 13 mm
7	30027110	SUPPORT, VERSION M35-M ONLY
8	30015568	WASHER, FLAT, M3
9	30015563	NUT, M3
10	30026615	PCB 208 (LOW VOLTAGE MINILOADER ONLY)
	30027132	PCB 209 (FOR ALL KIT HUMIDIFIERS)
11	30027142	PROTECTION, PCB 208/209
12	30015956	CONNECTOR, FEMALE, 9 PIN
13	30027146	BRACKET, CONNECTOR SUPPORT
14	30015955	CONNECTOR, MALE, 9 PIN
15	30027137	BRACKET, ELEMENT SUPPORT
16	30025818	WASHER, M4 INTERNAL, M12 EXTERNAL
17	30015564	NUT, M4
18	30027107	SUPPORT
19	30027127	NIPPLE
20	30027201	SENSOR, WATER LEVEL
21	30027207	NUT, M17
22	30015569	WASHER M4
23	30027147	INLET, WATER

HUMIDIFIER ASSEMBLY
FIG C

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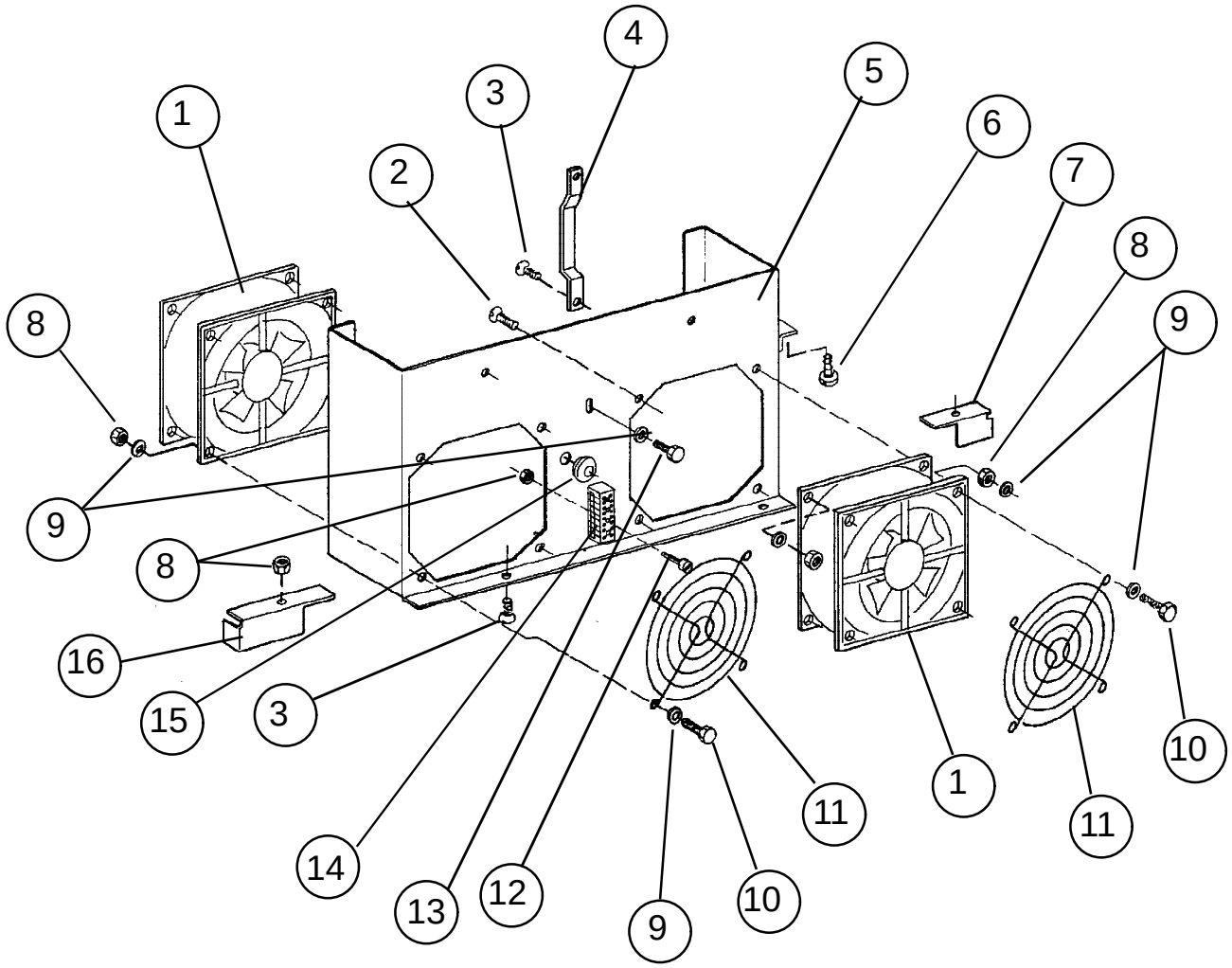

PARTS4.TIF
PARTS4A.TIF

HUMIDIFIER ASSEMBLY
FIG D

KEY	PART NO	DESCRIPTION
1	30027203	FAN, 12 VOLT
2	30015557	SCREW, CROSS-HEADED, COUNTERSUNK, M3 x 10
3	30015556	SCREW, CROSS-HEADED, COUNTERSUNK, M3 x 6
4	30027120	GUIDE, FILTER
5	30027106	SUPPORT, FAN
6	30025851	SCREW, SELF TAPPING, 3.9 x 13
7	30027116	FIXING, TRAY, RIGHT
8	30015563	NUT, M3
9	30015568	WASHER, FLAT, M3
10	30025106	SCREW, HEX-HEADED, M3 x 14
11	30015523	GRID, FAN
12	30015552	SCREW, CROSS-HEAD, M3 x 16
13	30015682	SCREW, HEX-HEAD, M3 x 8
14	30027218	CONNECTOR BLOCK
15	30027214	GROMMET, 7 mm
16	30027117	FIXING, TRAY, LEFT

HUMIDIFIER ASSEMBLY
FIG D

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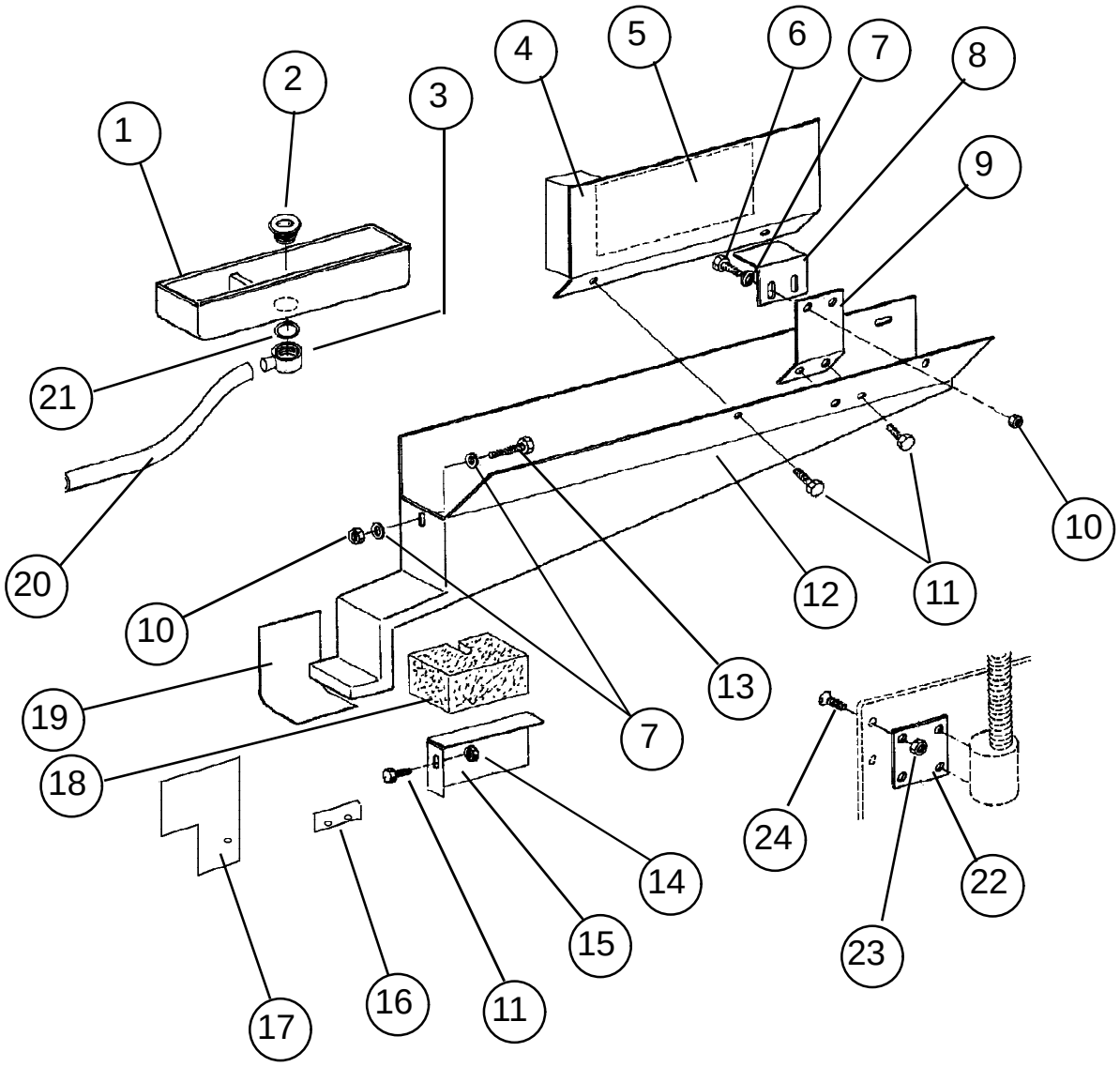

HUMIDIFIER ASSEMBLY
FIG E

PARTS5.TIF

KEY	PART NO	DESCRIPTION
1	30027109	TRAY, WATER
2	30027125	FITTING
3	30027123	FITTING
4	30027148	PROTECTION PLATE
5	30027131	LABEL, HUMIDIFIER
6	30015682	SCREW, HEX-HEADED, M3 x 8
7	30015568	WASHER, FLAT, M3
8	30027115	BRACKET
9	30027119	BRACKET
10	30015563	NUT, M3
11	30015537	SCREW, HEX-HEADED, M4 x 10
12	30027108	OVERFLOW TRAY
13	30025812	SCREW, HEX-HEADED, M3 x 20
14	30015564	NUT, M4
15	30027145	STOP, LIGHT PROTECTION (KIT HUMIDIFIER ONLY)
16	30027149	PROTECTION, METAL PANEL HUMIDIFIERS ONLY
17	30027150	PROTECTION, METAL PANEL HUMIDIFIERS ONLY
18	30027143	BLOCK, RUBBER (KIT HUMIDIFIER ONLY)
19	30027144	BRACKET (KIT HUMIDIFIER ONLY)
20	30027209	TUBE, 10 x 14
21	30027212	SEAL, "O" RING
22	30027118	ADAPTOR PLATE, MODEL M35-M ONLY
23	30015565	NUT, M5
24	30025825	SCREW, CROSS HEADED, COUNTERSUNK, M5 x 10

HUMIDIFIER ASSEMBLY
FIG E

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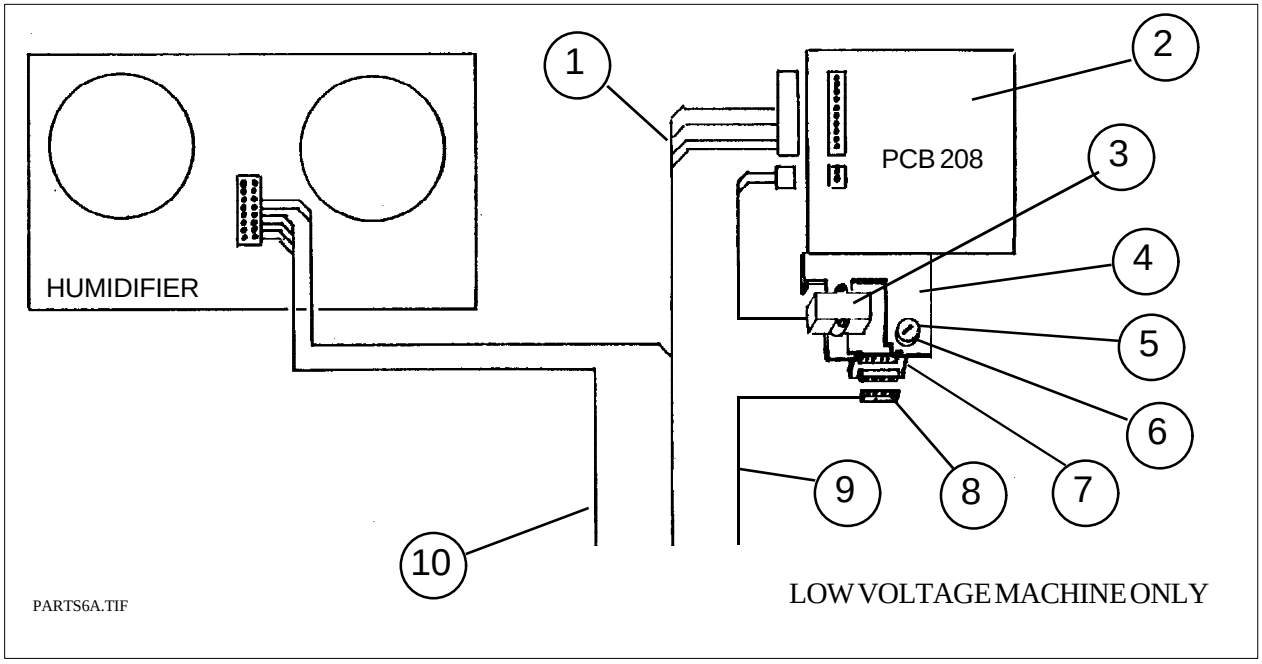

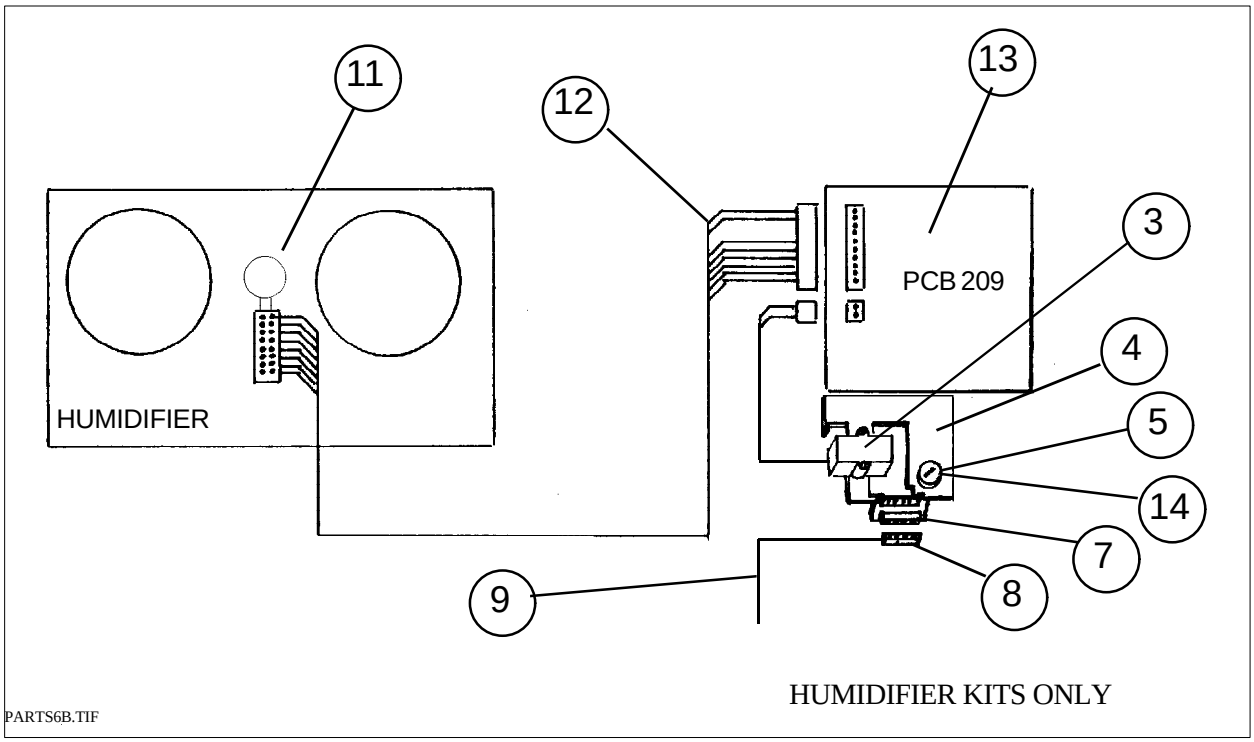

HUMIDIFIER ASSEMBLY
FIG F

KEY	PART NO	DESCRIPTION
1	30027135	CABLE, PCB 208 TO 207 - LOW VOLTAGE MACHINE ONLY
2	30026615	PCB 208 - LOW VOLTAGE MACHINE ONLY
3	30027227	FILTER, EMI, ARCOTRONICS
4	30027226	FILTER/FUSE ASSEMBLY COMPLETE
5	30027224	FUSEHOLDER, OMEGA K1010
6	30027225	FUSE, T500 mAMP, 5 x 20 mm
7	30027229	PLUG, MALE, 4 POLE
8	30027228	PLUG, FEMALE, 4 POLE
9	30027133	CABLE, TRANSFORMER TO EMI FILTER
10	30027136	CABLE, PCB 207 TO HUMIDIFIER - LOW VOLTAGE MACHINE ONLY
11	30027223	POTENTIOMETER 47 R, 5 WATT - KIT HUMIDIFIER ONLY
12	30027134	CABLE PCB 209 TO HUMIDIFIER - KIT HUMIDIFIER ONLY
13	30027132	PCB 209 - KIT HUMIDIFIER ONLY
14	30025644	FUSE, T2 AMP, 5 x 20 mm

IMPORTANT - MAKE SURE YOU ORDER THE CORRECT PARTS FOR THE VERSION OF HUMIDIFIER THAT IS FITTED TO THE MINILOADER

HUMIDIFIER ASSEMBLY
FIG F

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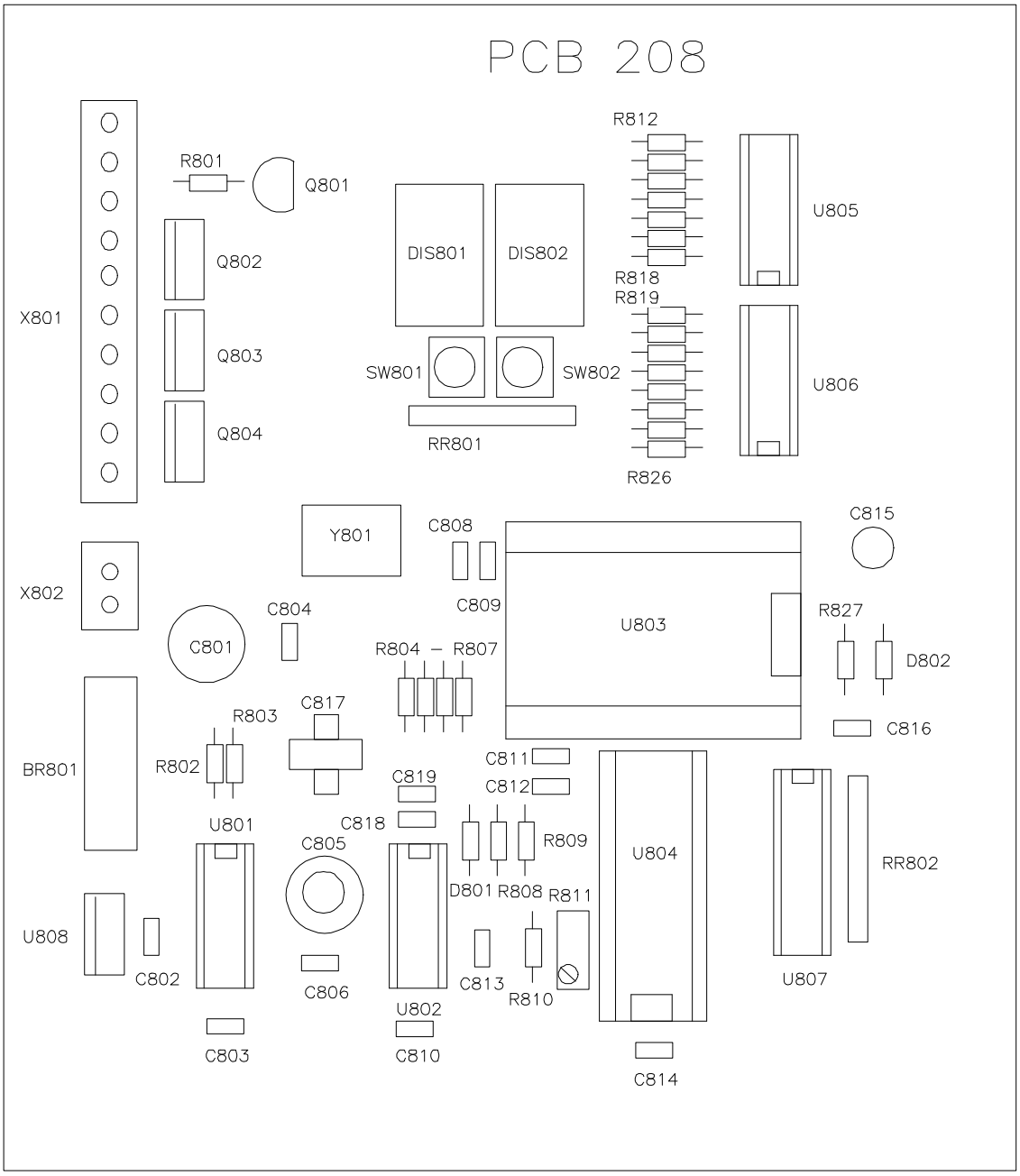

PCB208.PIC

HUMIDIFIER ASSEMBLY
FIG G

KEY	PART NO	DESCRIPTION
PCB 208	30026615	PCB 208 - LOW VOLTAGE MACHINE ONLY
BR801	30026630	DIODE BRIDGE, KBU604
C805	30026649	CAPACITOR, VARIABLE, 3 - 60 pF
C817	30026647	SENSOR, HUMIDITY, PHILLIPS
DIS801, 802	30026656	DISPLAY, COMMON CATHODE
Q801	30025520	TRANSISTOR, NPN, BC547
Q802, 3, 4	30026626	TRANSISTOR. MOSFET, BUZ10
U801, 802	30026642	INTEGRATED CIRCUIT, 4001, QUAD 2 INPUT NOR
U803	30025505	INTEGRATED CIRCUIT, MICROPROCESSOR , 78C10
U804	30027220	INTEGRATED CIRCUIT, EPROM, V. HUMIDIFIER 01
U805, 806	30026643	INTEGRATED CIRCUIT, 4511, BCD TO 7 SEG DRIVER
U807	30025508	INTEGRATED CIRCUIT, BUFFER, 74HC373
U808	30025523	INTEGRATED CIRCUIT, 7805, VOLTAGE REG.

IMPORTANT - MAKE SURE YOU ORDER THE CORRECT PARTS FOR THE VERSION OF HUMIDIFIER THAT IS FITTED TO THE MINILOADER

HUMIDIFIER ASSEMBLY
FIG G

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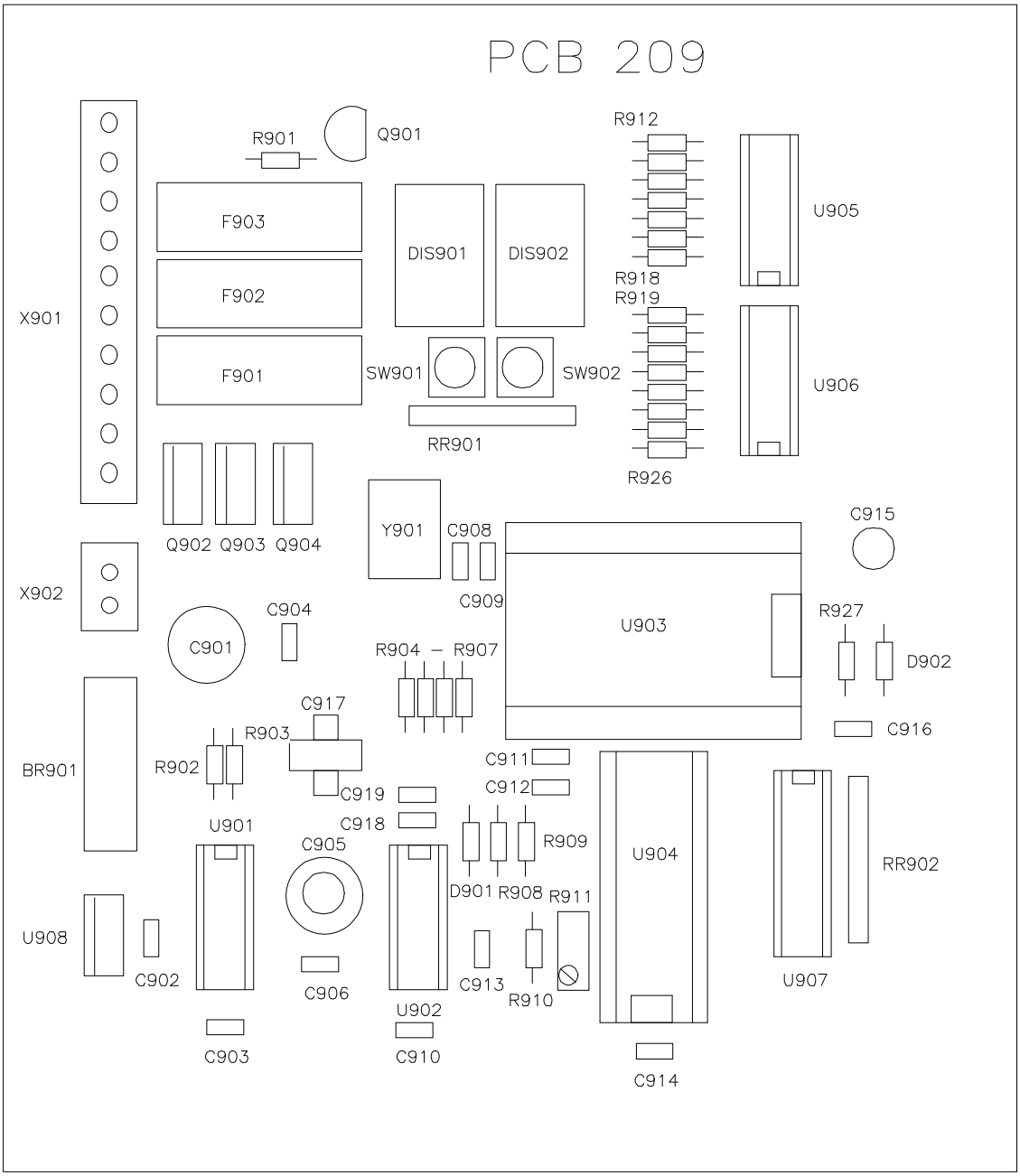

PCB209.PIC

HUMIDIFIER ASSEMBLY
FIG H

KEY	PART NO	DESCRIPTION
PCB 209	30027132	PCB 209 - HUMIDIFIER KITS ONLY
BR901	30026630	DIODE BRIDGE, KBU604
C905	30026649	CAPACITOR, VARIABLE, 3 - 60 pF
C917	30026647	SENSOR, HUMIDITY, PHILLIPS
DIS901, 902	30026656	DISPLAY, COMMON CATHODE
F901, 2, 3	30025642	FUSE, 5 x 20 mm, T1A
	30025591	FUSEHOLDER, PCB TYPE
Q901	30025520	TRANSISTOR, NPN, BC547
Q902, 3, 4	30026626	TRANSISTOR. MOSFET, BUZ10
U901, 902	30026642	INTEGRATED CIRCUIT, 4001, QUAD 2 INPUT NOR
U903	30025505	INTEGRATED CIRCUIT, MICROPROCESSOR , 78C10
U904	30027220	INTEGRATED CIRCUIT, EPROM, V. HUMIDIFIER 01
U905, 906	30026643	INTEGRATED CIRCUIT, 4511, BCD TO 7 SEG DRIVER
U907	30025508	INTEGRATED CIRCUIT, BUFFER, 74HC373
U908	30025523	INTEGRATED CIRCUIT, 7805, VOLTAGE REG.

IMPORTANT - MAKE SURE YOU ORDER THE CORRECT PARTS FOR THE VERSION OF HUMIDIFIER THAT IS FITTED TO THE MINILOADER

HUMIDIFIER ASSEMBLY
FIG H

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Rev. Date	PCN No.	Pub.No.	Affected Pages	Description
October 94	1	300800xx	9, 14,15, 28, & 30	Corrected drawings of PCB 208 & 209 overlays.
November 94			26,27	Added POTENTIOMETER to drawing and text.

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HEALTH SCIENCES DIVISION

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